

REMARKS

Claims 43-99 are pending in the current application. Applicants have amended claims 43, 55, 65, 78, and 90. Reexamination and reconsideration of all pending claims are respectfully requested.

In general, Applicants have amended the independent claims to include elements configured to balance aberrations to reduce decenter sensitivity in the Mangin mirror element, focusing lens(es), and field lens(es) (e.g. claim 43, as amended), and the fact that the elements are substantially aligned along a single axis. Configuring the Mangin mirror element, focusing lens(es), and field lens(es) to balance aberrations is not shown in the cited references. Support for these aspects of the design are shown in the specification at page 20, line 16 through page 21, line 5:

...Using the present design, it is possible to reduce the decenter sensitivity of the lens and mirror elements by carefully balancing the aberrations within the catadioptric group 312 and focusing lens group 311. Total aberrations of the catadioptric group may be optimized using the design of FIG. 3 to balance the compensation required by the field lens group 305 and focusing lens group 311.

Regarding decenter sensitivity for the objective, a 10 micron decenter, without any compensators, introduces less than approximately 0.27 waves of aberration in all elements. The catadioptric group 312 is particularly insensitive in that a 10 micron decenter of element 306 and 307 introduces less than 0.15 waves of error. In the design presented in FIG. 3, average tolerance is approximately 0.15 waves of error at approximately 313nm. Further balancing of tolerances on the elements in the catadioptric group 312 is also possible to enhance decenter sensitivity performance.

35 U.S.C. § 103

The Office Action rejected claims 43-51, 53-74 and 88-99 under 35 U.S.C. §103 based on U.S. Patent Application 2001/0040722 to Shafer et al. (“Shafer 722”) in view of U.S. Patent 4,108,794 to Yonekubo (“Yonekubo”) and further in view of Allan, U.S. Patent 6,785,051 (“Allan”). The remaining claims 52, 75, and 87 were rejected under 35 U.S.C. §103 based on Shafer 722 in view of Yonekubo, Allan, and further in view of Deutsch et al., WO 01/57563 A2.

Shafer 722 is a broad band DUV/VUV catadioptric imaging system using an off-axis implementation that corrects primary, secondary, and higher order lateral color, and chromatic variations of aberrations such as spherical, coma, and astigmatism. Shafer 722, paragraph [0039]. The sole mention of “decentering” or “decenter” is in paragraph [0096], which states in pertinent part:

...The arrangement of FIG. 7 also allows for improved design performance and relaxes manufacturing tolerances. *For example, the decentering of any lens element by 5 microns will cause less than one quarter wave of coma without using any compensation elements. Using element decenters and tilts as compensation elements, the tolerances become even more relaxed.* The arrangement of FIG. 7 includes one bend with some lenses after the second internal image. These lenses have extremely relaxed tolerances and tend not to affect the manufacturability of the system. The arrangement of FIG. 7 also has an external pupil plane 701 for aperturing and Fourier filtering. This pupil plane is in the collimated region so it corresponds to the Fourier plane of the object. The object in the arrangement of FIG. 7 extends from 0.25 mm to 0.75 mm off axis and the design has a bandwidth of 1 nm from 192.8-193.8 nm. ...

(emphasis added).

This passage discusses decentering generally, but the Shafer 722 design does not (1) have alignment substantially along a single axis, nor (2) have a construction configured to balance aberrations between elements, where aberration balancing reduces decenter sensitivity of the elements of the design. The paragraph [0096] passage of Shafer 722 states that decentering of any lens element in the design by 5 millimeters causes less than a quarter wave of coma, and use of element decenters and tilts can relax tolerances. This does not speak to a configuration to balance aberrations between elements, where being configured to balance aberrations reduces decenter sensitivity. These aspects of all the independent claims, as amended, including the axial alignment of elements and the elements being configured to balance aberrations to reduce decenter sensitivity, are missing from Shafer 722. Yonekubo and Allan do not disclose nor suggest these aspects of the design. Yonekubo shows an immersion substance used in connection with microscopes, while Allan shows a birefringence compensation design that differs from the current design and does not include the beneficial design aspects claimed. For this reason alone, namely the absence of elements configured to balance aberrations to reduce decenter sensitivity, the claims as amended are allowable.

Further, Applicants dispute the contention that the present design is obvious in view of Shafer 722 in combination with Yonekubo and further in combination with Allan. Shafer 722 is a broad band DUV/VUV imaging system that does not employ an immersion substance, does not discuss an immersion substance, and does not illustrate an embodiment having a mangin mirror arrangement wherein light energy enters through a back or rear side and is provided to a specimen, but rather uses a mangin mirror element to provide substantially what may be termed a retro beam reflecting light energy back from the light energy received (see, e.g., FIG. 3). One critical issue is the complete absence of an immersion substance from the Shafer 722 reference.

Yonekubo does not disclose nor suggest the unique properties associated with the present design, including but not limited to elements configured to balance aberrations to reduce decenter sensitivity, providing light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range and focusing the light

energy using at least one lens into focused light energy, where each lens used in said focusing has diameter less than approximately 100 millimeters. Yonekubo show immersion substances used in microscopes, but do not indicate use with light energy having a wavelength in the range of approximately 157 nanometers through the infrared light range, use focusing lenses and field lenses as claimed, or disclose or suggest at least one Mangin mirror element having diameter less than 100 millimeters receiving light energy. It is as if an immersion substance was found in these references and assumed to be insertable wholesale into the Shafer 722 device. However, one could not simply place an immersion substance within the Shafer 722 design and obtain an objective design having the beneficial aspects presently claimed or operating with any level of adequate performance. In other words, the resultant device would be a poor image and inadequate inspection in the environment claimed. Thus it is difficult, if not impossible, to argue that one would be motivated to combine the design of Shafer 722 with the immersion substances of Yonekubo based on the disclosure of the references themselves.

Applicants had previously amended certain independent claims to denote that light energy enters a mangin mirror element, a feature clearly missing from Shafer 722 and of course not mentioned whatsoever in the immersion references. Nonetheless, in an effort to again deprecate the claims, the Office Action relies on Allan, a reference that neither shows nor suggests the use of an immersion substance, nor an objective constructed as claimed, i.e. having lenses with maximum diameter 100 millimeters, or other pertinent limitations claimed. Allan is merely cited to show a design wherein light energy passes through a mangin mirror element, i.e. through a mangin mirror element and transmitted to a specimen. Other limitations presented in the independent claims are missing entirely from Allan. Allan does not include a specific prescription or measurements for the elements of FIG. 2. Allan does not mention an immersion substance between the mangin element and a specimen. Allan discusses operation at less than 200 nm (ultraviolet) but does not discuss operation up to the ultraviolet range.

In sum, neither Shafer 722 nor Allan disclose or suggest use of an immersion substance whatsoever. This motivation is provided solely by the Office Action, having

viewed Applicants' claims and reconstructing the claimed invention using the claims as a guide, essentially plugging in an immersion substance into a combination of Shafer 722 and Allan, if such a combination could result in anything useful. It is unclear what type of objective would result from a mangin mirror wherein light energy passes through in a design such as Shafer 722 – however, it would likely not provide any type of usable inspection system, unlike the design presented in Applicants' disclosure.

There is simply no suggestion in Shafer 722 to employ an immersion liquid or substance or a mangin mirror element where light energy passes through a back side thereof, and no motivation in Yonekubo to use an immersion liquid or substance in a complex lensing design comprising, for example, field lenses, focusing lenses, and a mangin mirror element, wherein field lenses and focusing lenses have components less than 100 millimeters in diameter. There is also no teaching nor suggestion in Allan to use an immersion substance, nor to provide lenses having diameter of less than 100 millimeters. None of the references disclose or discuss elements configured to balance aberrations to reduce decenter sensitivity. Simply put, these references are materially diverse and each reference does not suggest employing the features disclosed in any of the other references in any manner whatsoever.

The standard for making an obviousness rejection is set forth in MPEP 706.02(j):

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. [citations omitted]

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to

obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

The Office Action fails to meet this burden. Although the Office Action tries to describe how one skilled in the art would have been motivated to modify Shafer 722 to incorporate the teachings of Allan and further the teachings of Yonekubo, these attempts fall short.

The Office Action states the motivation to combine the Shafer 722 reference with the immersion references (Yonekubo) is that immersion substances provide “better imaging performance,” and suggesting the motivation to combine is “to provide better imaging performance because of reduced refractions due to the index matching provided by the immersion substance.” Office Action, page 4. This is not a motivation to combine, but a conclusory, beneficial *result* which simply generically states the benefits of immersion substances, where the conclusion is gleaned from the teachings of Applicants and specifically Applicants’ claims in an effort to deprecate Applicants’ invention.

It is disingenuous and overly simplistic to say that an alternative design, wherein an immersion substance is completely missing, but that includes an immersion substance, would be desirable. Alternatives are always desirable. However, Shafer 722 specifically contemplates an objective design for use in the DUV/VUV realm *without any need, suggestion, or motivation to employ such an immersion substance*. The immersion substance, as shown by Appellants’ disclosure, enables users to successfully inspect specimens using light from 157 nm through the infrared range, where light energy passes through a back side of an element such as a mangin mirror element, features not taught by Shafer 722. Neither Shafer 722 nor Allan in any way contemplates the use of immersion substances, even though immersion substances were known and available.

The motivation to combine Allan with these other references is said to “make the Mangin mirror of Shafer et al. a double-reflecting one with central apertures as suggested by Allan to be able to make a more compact objective configuration by negating the need for the light to be reflected out of the optical path and back into the optical path as shown by Shafer FIG. 3.” Office Action, p. 4. These are not motivations to combine; these statements are conclusory statements of plugging components from one reference into another without any support in the references themselves, any reason for combining the references, or any likelihood that such a combination could be realized or in any way successful. These statements materially differ from previous alleged motivations to combine, suggesting that the individual design aspects from these references are being combined with no motivation whatsoever, or at best with the motivation being developed or refined as time progresses. Applicants respectfully submit that this reasoning is tantamount to using hindsight to combine the references, or at the very least using hindsight to come up with a motivation to combine the references when none actually exists, both of which are improper. There is no reasonable expectation present in Shafer 722, Allan, and/or Yonekubo that use of a “double reflecting” mangin mirror element in the Shafer 722 design, such as FIG. 3 thereof, would be expected to produce a successful and useful device, without jettisoning significant parts of the designs and using Applicants’ disclosure as a guide. The statements of alleged motivation to combine in the Office Action are nothing but a valiant attempt to justify a hindsight reconstruction of Applicants’ claims, using Applicants’ disclosure and claims as a guide.

Applicants are not advocating that the Allan mangin mirror element 60 cannot be wholesale plugged into the design of FIG. 3 of Shafer 722 (although in reality it can’t). Applicants submit that even using the general concepts disclosed in the references, one could not make a usable design from the teachings of Shafer 722 in combination with Yonekubo and Allan. Applicants are arguing that you cannot use an immersion substance, such as is disclosed in Yonekubo, in conjunction with a design such as Shafer 722, nor a mangin mirror having the general properties as shown in Allan with an objective design such as is shown in Shafer 722 and the immersion substances, to produce a usable objective without the need to resort to undue experimentation. The only

way to get a usable design such as that suggested would be by using the teachings of Applicants.

Applicants also note that broad conclusory statements regarding the teaching of multiple references, standing alone, are not “evidence” of a motivation to combine the references. *In re Zurko*, 59 USPQ2d 1693 (Fed. Cir. 2001); *McElmurry v. Arkansas Power & Light Co.*, 995 F.2d 1576, 1578, 27 USPQ2d 1129, 1131 (Fed. Cir. 1993) (“Mere denials and conclusory statements, however, are not sufficient to establish a genuine issue of material fact.”)

As noted, the PTO has the burden of establishing a *prima facie* case of obviousness under 35 U.S.C. § 103. The PTO must show that some objective teaching in the prior art or knowledge generally held by one of ordinary skill would lead an individual to combine the relevant teachings of the references. *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988). Therefore, a combination of relevant teachings alone is insufficient grounds to establish obviousness, absent some teaching or suggestion to do so. *Id.* at 1075. In this case, the Office Action does not point to any teaching or suggestion in the cited references that would lead an artisan to come up with the claimed invention.

The Federal Circuit has held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. *ACS Hospital System, Inc. v. Montefiore Hospital*, 732 F.2d 1572 (Fed. Cir. 1984). Without some showing in the prior art that suggests in some way a combination in order to arrive at the claimed invention, it is impermissible to use the Applicants’ teaching to search references for the claimed elements and combine them as claimed. *In Re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991); *In Re Laskowski*, 871 F.2d 115, 117 (Fed. Cir. 1989); *see also, Ex Parte Lange*, 72 U.S.P.Q. 90, 91 (C.C.P.A. 1947) (“It seems to us that the Examiner is using appellant’s disclosure for the suggestion of the combination since there is no suggestion in any of the patents for their combination in the manner claimed by Applicant.”); *In re Leonor*, 158 U.S.P.Q. 20, 21

(C.C.P.A. 1968) (the issue is “whether teachings of prior art would, of themselves, and without benefit of applicant’s disclosure, suggest [a process] which would make claimed invention obvious...”) (emphasis in original). As noted, the Shafer 722 and Allan references do not suggest using immersion substances, such as the immersion substances of Yonekubo or Suwa, to produce the unique inspection systems and methods claimed in Applicants’ independent claims 43, 55, 78, and 90.

Applicants submit that the Office Action uses hindsight in rejecting the claims herein. It is only through hindsight, after seeing Applicants’ disclosure, that it would be considered possible to create the objectives and methods claimed by the Applicants. With regard to the use of hindsight, or the use of an Applicant’s teaching to combine references, the courts have overwhelmingly condemned such combinations and have upheld the validity of patents or claims of patents in which such hindsight was employed to combine the references. *W.L. Gore Associates, Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983), (condemning the “insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher”); *In re Fine*, 837 F.2d at 1051 (“One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.”) Appellants respectfully submit that combination of aspects of the Shafer 722 reference with the Yonekubo or Suwa references and further with the Allan design is merely a hindsight reconstruction of the invention using Applicants’ disclosure and attempting to use Applicants’ claims as a guide. Such hindsight reconstruction of the claimed system is inappropriate and thus rejection of the independent claims for this reason is improper.

The argument is sometimes made, citing *In re Sernaker*, 702 F.2d 989 (Fed. Cir. 1983) and *In re Nilssen*, 851 F.2d 1401 (Fed. Cir. 1988), that no express suggestion in the references for the combination of references is necessary. However, the issue is whether the references as a whole suggest the particular combination being used to reject the claims on obviousness grounds. When the Examiner must resort to selecting elements of various teachings in order to form the claimed invention, he or she must establish first that there is a suggestion or motivation in the prior art to make the particular selection made by applicant.

In re Gorman, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). The Examiner has not established any legitimate suggestion or motivation to make the cited combination – she has only asserted that it would be desirable to employ some type of “immersion substance” in an objective design because it might provide better imaging performance.

Applicants therefore submit that there is no motivation to combine the teachings of Shafer 722 with Yonekubo and further with Allan present in the references themselves, and it is only through the use of impermissible hindsight that one could construct the invention as claimed. Thus independent claims 43, 55, 65, 78, and 90 are not obvious in view of the cited references.

Applicants respectfully submit that combining the immersion substance of Yonekubo with the Shafer 722 design, and further with the “double reflecting” mangin mirror arrangement of Allan is merely a hindsight reconstruction of the invention using Applicants’ disclosure and claims as a guide. Such hindsight reconstruction of the claimed system is inappropriate and thus rejection of independent claims 43, 55, 65, 78, and 90 in this manner is improper.

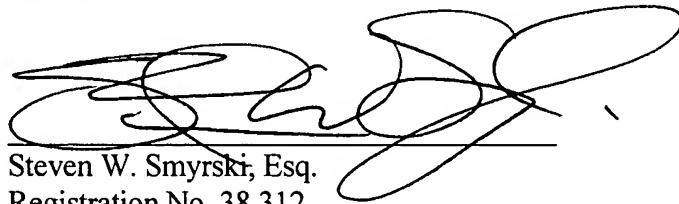
For the foregoing reasons, Applicants thus respectfully submit that claims 43, 55, 65, 78 and 90, as amended, are allowable over the references of record, and that all claims dependent from these allowable independent claims are allowable as they depend from an allowable base claim.

CONCLUSION

In view of the foregoing, it is respectfully submitted that all claims of the present application are in condition for allowance. Reexamination and reconsideration of all of the claims, as amended, are respectfully requested and allowance of all the claims at an early date is solicited.

Applicants believe that no fees are due in accordance with this Response beyond those included herewith. Should any fees be due, the Commissioner is hereby authorized to charge any deficiencies or credit any overpayment to Deposit Account 502026.

Respectfully submitted,



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